

1     **CLAIMS**

2     Having thus described our invention, what we claim as new and  
3     desire to secure by Letters Patent is as follows:

4     1.   A method comprising:

5     differentiating at least one service class in a kernel to perform  
6     service differentiation based on content in at least one data  
7     packet, including the steps of:

8     capturing said at least one data packet until a complete  
9     application header is detected;

10    parsing said complete application header to determine at least  
11    one application tag;

12    matching said at least one application tag to at least one  
13    matching rule;

14    determining a presence of at least one match with said at least  
15    one matching rule; and

16    performing service differentiation action based on said at least  
17    one matching rule.

18    2.   A method as in claim 1, wherein said at least one application  
19    tag includes at least one tag taken from a group of tags  
20    including: URI, cookie, request method, HTTP version, a tag in an  
21    application protocol, and a tag in a communication protocol.

1 3. A method as in claim 2, wherein the URI is the second string  
2 in a HTTP header and the cookie starts with a cookie delimiter as  
3 defined in an application protocol.

4 4. A method as in claim 1, further comprising employing a table  
5 having said at least one matching rule.

6 5. A method as in claim 1, wherein the step of determining  
7 includes finding a best match.

8 6. A method as in claim 1, wherein said step of performing  
9 service differentiation action includes at least one action taken  
10 from a group of actions including: dropping, rate controlling,  
11 scheduling connections, monitoring, request prioritization, and a  
12 policing action.

13 7. A method as in claim 6, wherein said action of dropping  
14 includes discarding a connection.

15 8. A method as in claim 6, wherein said action includes at least  
16 one act taken from a group of acts including: sending a reset  
17 message, sending an application return code, determining  
18 compliance with a given rate and/or burst, prioritization,  
19 weighted round robin, round robin, ordering, recording  
20 statistics, performing a cleanup, and protocol control.

21 9. A method as in claim 1, further comprising installing at  
22 least one matching rule.

23 10. A method as in claim 1, further comprising detecting  
24 establishment of a new connection.

1 11. A method as in claim 10, wherein said step of detecting  
2 includes establishing of a new TCP connection.

3 12. A method as in claim 11, wherein said step of establishing  
4 of a new TCP connection includes: receiving SYN packet; sending  
5 SYN-ACK packet; deferring accept; receiving ACK for SYN-ACK  
6 packet; and deferring notification of data packet.

7 13. A method as in claim 1, wherein said step of capturing  
8 includes detecting application header delimiters for said at  
9 least one data packet.

10 14. An apparatus comprising a service differentiation module  
11 including:

12 a parser to parse a client Web request;

13 a classifier to classify the request based on application headers  
14 and assigning a request class within a kernel;

15 a selector to determine an action rule based on the request  
16 class; and

17 a performer to apply the action rule based on the request class.

18 15. An apparatus comprising a policy agent, said policy agent  
19 including:

20 a communicator to communicate from a user space to a kernel with  
21 an application interface;

1 an initializer to instantiate service differentiation rules for  
2 an application tag within the kernel which include classification  
3 and action rules; and

4 a manager to delete and update rules on a user request.

5 16. A method comprising:

6 forming a rule, including the steps of:

7 communicating from a user space to a kernel with an application  
8 interface;

9 instantiating service differentiation rules for an application  
10 tag within the kernel which include classification and action  
11 rules; and

12 deleting and adding rules based upon a user request.

13 17. A method as in claim 16, further comprising updating rules  
14 based upon a user request.

15 18. An article of manufacture comprising a computer usable  
16 medium having computer readable program code means embodied  
17 therein for causing service differentiation, the computer  
18 readable program code means in said article of manufacture  
19 comprising computer readable program code means for causing a  
20 computer to effect the steps of claim 1.

21 19. A program storage device readable by machine, tangibly  
22 embodying a program of instructions executable by the machine to

1 perform method steps for service differentiation, said method  
2 steps comprising the steps of claim 1.

3 20. A computer program product comprising a computer usable  
4 medium having computer readable program code means embodied  
5 therein for causing service differentiation, the computer  
6 readable program code means in said computer program product  
7 comprising computer readable program code means for causing a  
8 computer to effect the functions of claim 14.

9 21. A computer program product comprising a computer usable  
10 medium having computer readable program code means embodied  
11 therein for causing rule installation, the computer readable  
12 program code means in said computer program product comprising  
13 computer readable program code means for causing a computer to  
14 effect the functions of claim 15.